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Essay By James Macrae
of Virginia
on ~~Leg de Uterine~~ Crae.

Uterine Hemorrhage. admitted March 9. 1819.

Since no circumstance that attends pregnancy exposes women to so much danger as profuse hemorrhages from the uterus towards the latter end of gestation, & in the time of labour; and as there is none which is more alarming, or requires more promptness, & activity on the part of the practitioner, I presume it will not be deemed improper, or wholly unnecessary that some attention should be paid to the situation of the uterus, its general structure, & the changes which it undergoes from the time of conception until the expulsion of the foetus. Entertaining the opinion therefore that it will greatly contribute to a true knowledge of the disease, & facilitate its comprehension I shall give the subject a cursory consideration.

The uterus is that organ in which the foetus is nourished, & developed, and is situated in the pelvis between the rectum, & bladder with both of which it has connection. The general division of it, is into fundus, body, & neck. The fundus comprehends all that portion above the insertion of the fallopian tubes; the body is immediately beneath, & extends to the narrowest part

of this organ, where the neck commences, which terminates in the part denominated os tincæ; the two sides of which have been called the lips of the uterus. The vascularity of the uterus is very considerable, having a copious supply of blood from the hypogastric & spermatic arteries. These become materially altered during gestation, for in the unimpregnated state they are comparatively very small, & convoluted, but as pregnancy advances they become very much enlarged, & much more direct in their course. The veins are equally numerous, and tortuous, & their size in the unimpregnated state corresponds with that of the arteries; but in the latter periods of gestation they are so much enlarged as to admit the extremity of the finger. — The lymphatics are also considerably augmented at this time, & the uterus has a large supply of them. — Though the muscularity of the uterus becomes manifest in proportion as it enlarges during the progress of pregnancy; yet the exact distribution of its fibres has hitherto eluded the investigation of the most acute, & assiduous anatomists, & their various sentiments upon this subject seem rather calculated to show the difficulty of ascertaining the truth than the accuracy of their observations. Some have ventured so far as to assert it has no muscularity whatever, while others maintain with more plausibility that it is almost exclusively so. Ruysch, Dr William Hunter, & several others have each offered different opinions upon this subject, showing that anatomical research cannot furnish us with satis-

factory information, & that we must resort to some other means for a more clear explanation of the difficulty. These we conceive to be the contractions of the uterus itself, of which more will be said hereafter. — It does however appear from the phenomena of parturition, & the regular changes which take place in the uterus during that period, & even before, that this viscus has at least two sets of muscular fibres running in different directions, viz, the longitudinal, & circular.

The longitudinal are those which run in the perpendicular direction of the uterus, & may be supposed to extend in a line more, or less straight from the fundus to the neck, consequently they must lessen its length when they contract.

The circular are in some degree antagonists of the longitudinal, and run in the direction of the transverse diameter; they also may be considered as commencing at the fundus & terminating at the os uteri.

Having noticed thus slightly the structure of the uterus it will be well to consider the various changes which ~~take~~ take place in it in consequence of conception, & the gradual developement of the foetus. These are as important as they are curious, & interesting; for until the period of impregnation this organ seems only to possess that modification of sensibility, and contractility which are necessary for the purposes of nutrition, & the menstrual discharge. — But so soon as conception has taken place, new sympathies are called into action which pro-

* or one membrane consisting of two lamina

duce the remarkable phenomena we are about to notice. In consequence of the very intimate connection which exists between the ovaria, & the uterus, particularly its internal surface, so soon as an ovum is impregnated a new action is produced in order that the uterus may be prepared for its reception. To fulfil this purpose two membranes are formed, called Decidua, Deciduæ reflexa; the former lies in contact with the internal surface of the uterus, & is perforated by three openings, one at the os uteri the others at the insertion of the fallopian tubes; the latter, or the decidua reflexa is also extended over the surface of the uterus, & is entire in every part; so that when the embryon has passed down the tube it meets with this membrane, which obstructs its further progress; but by the successive development of the ovum this uterine coat is gradually pushed forward until it becomes completely enveloped in it. This vascular membrane unites in many points with the vessels produced by the chorion, part of which are generally supposed to form the fœtal portion of the placenta, & the rest gradually disappear, But a more ingenious, & plausible opinion is entertained by Dr. DeMees, who supposes that none of the vessels shooting out from the chorion are ever destroyed, but that they all go to form the placenta, & that there is a point from which the development of the membranes surrounding the fœtus takes place, leaving the vessels behind it. — —

Opinions were formerly much divided with respect to the

state of the uterus during pregnancy, but it was generally imagined that it became thinner in proportion to its distention. Later observation however has ascertained that it maintains its thickness through the whole period, whatever may be the degree of its augmentation. This enlargement nevertheless is not uniform, for it is always found thickest at that portion to which the placenta is attached, & thinnest at the neck; which is obviously owing to the difference of vascularity in the two parts, or the greater size of the vessels of the one than the other, & not because the neck is mechanically stretched either by the weight of the foetus, or waters.

The point being settled then that the uterus loses nothing in the diameter of its parietes in consequence of its increase of volume, but rather gains, the question at once arises, how is this augmentation produced? This we believe is effected by two causes; and first from an increased influx of blood to it, by which its various vessels become larger, & less convoluted; its fibres are made to recede from each other, more cellular membrane is formed, & every part being ~~less convoluted~~ more developed renders the uterus much more distensible, & liable to yield to slight impulses from the gradual growth of the foetus.

In order however to explain how this organ maintains a determined shape, and acquires such an enormous increase of capacity, we must advert to something more than the above mentioned cause, for it seems rather to account for the di-

ameter of its parietes, than the size of its cavity. We therefore have recourse to the ovum itself as the most probable agent; but with respect to this, much difference of opinion prevails, and the following reasons are urged against it. It is stated that the uterus cannot be distended by the increasing ovum, because it is always found until the time of labour loose, & somewhat yielding; that it is never stretched to its greatest extent, & allows the foetus to alter its shape in every motion which it may make. But

But I do not perceive the least force in these objections, for it is neither necessary, nor reasonable to suppose that a body shall be distended to its greatest extent in order to prove that it is acted upon by a contained agent; for on the contrary the very circumstance of its being in a lax, and yielding condition ought to satisfy us that it is more liable to be influenced by slight impulses, since there is less resistance to overcome & of course no necessity for that immense force which some think requisite to produce the effects which we ascribe to the ovum. — — — —

I would however ask what is the condition of the uterus after conception? Its sides are dense, & unyielding; its internal surfaces are in contact or nearly so, and some power would certainly be required to distend it if we deprive it of the influence of the ovum, which seems to counteract the effects that would result from an increased size of

vessels, the formation of cellular membrane, & the filling up of the sinuses with blood. — 2. the diameter of the urethra augmented by an accession of the penis? It undoubtedly is not. Could the urinary bladder be distended by an engorgement of its vessels without the assistance of the gradually percolating urine? Certainly not. — Then why suppose the uterine cavity could be enlarged by an increased influx of blood to its parietes? —

But without having recourse to these arguments, one circumstance I think will be sufficient to put it beyond dispute, which is, that if we only remove the foetus, or rupture the membranes the uterus will immediately contract, let the quantity of blood sent to it be what it may.

The cause of the first contraction of the uterus has been equally a subject of controversy, but as a full consideration of it would occupy too much time I shall merely observe that the opinion of Baudeloque is by far the most ingenious, & to him I refer.

"The uterus in common with all muscles enjoys two modes of action, a tonic, or elastic one which is equal, & constant, and a spasmodic contraction which is sudden, and momentary. By the former when it is distended it constantly endeavours to restore itself to its original state, but it is by the latter that it acquires the force necessary to overcome the obstacles to that restoration, & to deliver itself of the bodies which encumber, & incommod it.

But this tonic action may be so weak after delivery as to appear in some measure destroyed; as the uterus is in this case soft, and without apparent action, it is usual to express it by the name of atony. This case, often melancholy for the woman, is at the same time one of the most deplorable for the operator, whom unreasonable people consider as accountable for all events; for notwithstanding his utmost care, & activity, he has almost always the mortification to see the woman sink under an hæmorhage. — The spasmodic contraction of the uterus, is, as has been before stated a much more powerful action than its elasticity, & is produced by an irritating cause unknown to us, & totally independent of the will, for no woman can augment or diminish its force, though strong passions of the mind may call it into action or stop its progress. All parts of the uterus are supposed to contract at the same time, yet this contraction is not equally strong in every part, for if it were delivery could not take place. If it is stronger in what is commonly called the fundus, than in the neck, it is because the fibres are not equally disposed, or equally numerous in those two parts, for each fasciculus taken seperately seems to act with the same degree of force."

Having passed over this subject in as general a manner as I could, I shall now proceed to the consideration of those hemorhages from the uterus which occur during the last three months of pregnancy, during, & after labour. —

As those floodings which happen before the sixth month come more properly under the head of abortions, I will not be considered here; I shall merely observe that the consequences at so early a period of gestation are seldom to be dreaded; for if proper attention be paid to the woman, & such remedies are resorted to as have been proved by experience to restrain such discharges, they will very frequently stop entirely, & the woman will go to her full period. But if this should not be the case, & the hemorrhage should still augment, it will scarcely be to a degree that will endanger the life of the mother without the foetus, & membranes being thrown off. In these cases therefore the accoucheur has little to do, although it has been recommended by some that we should bring away the foetus in the earliest months, which I imagine is seldom necessary, & very difficult to accomplish.

But hemorrhages that precede the delivery of the full grown foetus, where the uterus has arrived at its greatest stretch, & the vessels have acquired their utmost magnitude, must be ever highly dangerous; for the discharge is always more profuse, & more difficult to suppress in proportion to the increased size of the vessels, & the peculiar causes which produce it. These hemorrhages were formerly considered as arising from two parts, only one of which was believed to be at all dangerous. The one was supposed to come from the vagina, & the other from the uterus. But as no discharge

of blood can take place from the former worthy the appellation of hemorrhage, & as the latter is the object of the present inquiry I shall not adhere to this division.

A separation of the placenta therefore either in whole, or part must be considered as the proximate cause of every considerable hemorrhage at this time; for by this means many large vessels are opened, & the uterus is unable to contract to close them. There is no portion of the uterus to which the placenta seems to be steadily, & uniformly attached: it is however so generally so situated that if the woman possess a good constitution, & no accident happen to her, it will not be detached until the child is delivered, & then it will be disengaged, & thrown off, and the uterus allowed to contract.

If then a flooding should come on either during labour, or before it, the detachment of the placenta must be owing either to some peculiarity of situation, accidental violence, or some morbid affection of the uterus: but it sometimes happens without our being able to assign any cause equal to the suddenness of the discharge. An inadvertent step, a blow, or the influence of the passions of the mind momentarily excited are all calculated to produce the disease; for the uterus seems to be influenced by every occurrence which affects the muscular system generally, & if by any means the muscles of the body should be thrown into strong action, this organ in its impregnated state must participate in it, to a greater, or less degree.

But should the placenta be affixed to the mouth of the uterus instead of the fundus, or body an hemorrhage will necessarily be the consequence, especially if the full term of utero-gestation has arrived, & labour has begun. - For it is plain it cannot remain safe as in the former case until the child is born, because the mouth of the uterus must dilate, & of course the placenta will be detached. The flow of blood will be according to the situation of it, & the size of the vessels opened.

If the middle of the placenta is attached to the os uteri it will be much more considerable, than if there was only a small portion of its edge covering it. This however is not always the case; for some women have been exposed to as imminent danger where the mere edge of the placenta was fixed upon the os uteri, as if the middle had been placed there. In cases therefore where the placenta is thus situated, though the woman may by proper management be conducted safely to the full period of utero-gestation; yet an hemorrhage is inevitable as soon as the mouth of the uterus begins to open; and it is precisely under these circumstances that upon the skill of the practitioner will often depend not only the life of the mother, but that of the child.

The danger attending hemorrhages is indicated by the general state of the woman, their cause, & the quantity of blood lost, which will vary in different constitutions. The symptoms are weakness, or quickness of the pulse, general paleness, coldness of

the body, & a ghastly, fallen countenance. The woman expresses a great deal of inquietude & restlessness which are attended with frequent faintings, high, laborious respiration, & ultimately convulsions, by which the patient is generally carried off.

The vomiting which often occurs in violent hemorrhages indicates the injury which the constitution has suffered, & the great debility of the woman; yet the action of vomiting contributes greatly to the suppression of the discharge, & the safety of the patient. In the advanced periods of pregnancy the degree of pain with which an hemorrhage is attended will also enable us to form an idea of the peril to which the woman is exposed, for pain proves the contractions of the uterus, & consequently that the constitution is not exhausted. These therefore are the symptoms of danger which occur when the woman is not ~~exhausted~~ destroyed by the first gush of blood: but she cannot be considered as out of danger notwithstanding she may not die from the loss, nor even because she may survive delivery, for besides other reasons, a fever, as I believe frequently happens, may come on, & carry her off.

It will appear then from what has been stated with regard to the causes of hemorrhages, that they are either accidental, or unavoidable; the one being the result of some fortuitous circumstance, & the other the necessary effect of the dilatation of the os uteri. It is equally true that of these two kinds of floodings only one of them can be

permanently relieved by the use of remedies, namely, that which arises from the accidental separation of the placenta; for the other where it is attached to the os uteri cannot possibly be entirely checked by any other means than the removal of the contents of the womb. I allude now principally to hemorrhages which come on after labour has commenced; for it has already been stated that notwithstanding the situation of the placenta just mentioned the woman may by proper management be conducted to the full time.

But while the uterus contracts strongly, & its mouth continues to dilate the discharge of blood will be proportionably increased, until the woman is so exhausted that she will die before the natural efforts are capable of effecting delivery.

If we admit then the preceding statement to be correct we cannot be much at a loss how to act, for on the one hand we shall be justified in employing such means to check the discharge, as will be hereafter mentioned, whereas on the other we must not hesitate to deliver, so soon as such conditions are complied with on the part of the uterus as are requisite for its performance.

Called to a case of uterine hemorrhage ~~therefore~~ it will be of the utmost importance to ascertain as soon as practicable the situation of the placenta, or whether it be at the mouth, or some other portion. For this purpose it is necessary as all symptoms must be very equiv-

ocal, & uncertain, to introduce the hand previously lubricated into the vagina, & a finger into the uterus: but this should be done with great caution, because we may detach a salutary clot which opposes, or at least moderates the discharge.

If the placenta should be situated at the neck we shall be enabled to distinguish it from the membranes, by its spongy, irregular, rough surface, & from coagula of blood by its greater thickness.

Having found therefore upon examination the placenta thus situated, & the discharge very profuse, we shall not hesitate to deliver by turning provided the mouth of the uterus be sufficiently dilated: For under such circumstances the woman is I believe in a majority of cases able to bear the further loss of blood without any very dangerous consequences, & if we were to attempt delivery we should not only be probably foiled, but we should injure the patient much more than the disease would which we were endeavouring to remove.

We can, & must wait then until the os uteri is put in a condition either by pain, or the discharge to admit of delivery: but in the mean time we should remain with our patient, enjoin perfect rest of both mind & body, & administer the acetate of lead, not with an expectation of stopping, but to diminish the discharge. As regards the mode of the introduction of the hand to turn in this case some difference of opinion exists. By some we are advised to pass by the

placenta, rupture the membranes, & thus deliver the child: whereas others recommend that we should pass the finger through the substance of it; & by degrees with the other fingers enlarge the opening until the hand can get through into the cavity of the uterus. But another method is now recommended, which is certainly far preferable, that is, to pass the hand on one side of the os uteri between the placenta, & that viscus, and always where it can be discovered, on the side where its edge approaches nearest the orifice, taking care at the same time not to rupture the membranes before the hand has arrived near its fundus, & there to pierce them, lay hold of the feet, draw them down, and deliver. By this means several important advantages are gained. The child's life will not be in jeopardy by a rupture of the umbilical vessels, which would be the case were the hand thrust through the placenta; the turning may be performed with much less difficulty by the retention of the waters, because it will obviate the contractions of the uterus upon the body of the child, & allow the practitioner to let them off at pleasure; and we do not have the difficulty of delivery augmented by the bulk of the placenta being added to that of the shoulders.

If in this operation any portion of the placenta should remain behind, it should be left to the efforts of nature provided the hemorrhage does not continue; but then it must be extracted.

Should we however ascertain by examination, or the influence which the contractions of the uterus have

upon the discharge that the placenta is not attached to the mouth we must pursue a different course, & be governed by circumstances.* Here we can administer such remedies as are calculated, not only to abate, but stop the hemorrhage; provided it is not so profuse, & the labour so far advanced as to require such a mode of conduct as shall be presently mentioned.

In order therefore to fulfil this indication the woman should be bled, provided the pulse is active; she should be kept in an horizontal position, & at perfect rest: the room must be made as cool as possible by admitting a free circulation of air, cold applications, cold drinks and above all the saccharum saturni must be had recourse to. Combinations of Opium, & Ipecacuanha are also considered of high utility, & the sugar of lead is sometimes added in small portions.

After pursuing this plan it will often happen that the discharge will go off entirely, or at least is greatly moderated; but should all these remedies fail, & the hemorrhage is so considerable as to endanger the life of the patient, it will be proper to attempt to bring the uterus in a state of contraction by rupturing the membranes. This is to be done during pain, as they are then in a state of tension. As soon as the waters are discharged the uterus contracts, & the mouths of the vessels are pro-

* It is said if the hemorrhage ceases when the pains come on we may infer that the placenta is attached remote from the mouth: but should it continue it is a proof that it is fixed there.

portionably closed; pains for the most part succeed, though not always, & the presentation being good, delivery is in a short time accomplished. But should these fortunate circumstances not occur, & the mouth of the uterus is sufficiently dilated, we must proceed to deliver the woman either by turning, or the forceps. If the head has escaped from the uterus and is in the cavity of the pelvis, the latter means must be resorted to; if not we shall be able to turn.

It most generally happens after the expulsion of the child that the placenta is spontaneously thrown off by the efforts of the uterus; though sometimes it is unfortunately retained, either by the inaction of the uterus, irregularity of that action, or by preternatural adhesions of the placenta to it. This state of syncope, or atony which has just been mentioned may arise either from an hemorrhage itself which precedes labour, an over distention of the uterus from a greater than usual quantity of water, or it may be the consequence of long continued and strong labour pains, producing an exhaustion that is always apt to succeed every species of immoderate action. But at no time is it to be more dreaded, or more certainly expected than after those labours in which the uterus is relieved of its contents almost instantaneously, & without any apparent effort; for here the child is washed out by the current of the waters, & the uterus falls into a sort of insensibility which interrupts its contractile powers. This state of the uterus will be dangerous in propor-

tion to its continuance, its affecting the whole, or part of it, and the quantity of the placenta detached.

But an hemorrhage occurring under these circumstances is not always apparent, for the blood may be so retained in the uterus that it shall acquire nearly the size which it had before delivery. This however will be more likely to take place where only the body & fundus are in a state of atony, than where it effects all parts of it; for in the former case the contraction of the neck will be sufficient to retain the blood; whereas in the later it cannot be done unless by some means, or other the vagina should be mechanically stopped up.*

When therefore a case of this kind happens the first object of the practitioner should be to bring the uterus to a state of contraction; in order that the mouths of the bleeding vessels may be closed, & that portion of the placenta, if any, which remains adhering may be detached. For this purpose brisk frictions must be made upon the abdomen, & continued as long as circumstances will permit; but should this fail, & the hemorrhage is so important, as by its violence & threaten danger, the placenta must be extracted by the introduction of the hand along the cord into the uterus. The stimulus which the presence of the hand gives the uterus will often have the effect of bringing on the its contractions so as to separate the placenta; but if it does not we must proceed to the operation by searching for the part detached, & then introduce

* Baudelocque

the fingers behind it so as gently to separate the whole, and bring it away, taking care that the uterus shall contract before the hand is withdrawn. If the whole of the placenta is detached nearly the same rules with regard to its delivery must be observed. Should the hemorrhage however continue, as will sometimes happen, after the placenta is extracted, we must resort to all those means recommended for its suppression as speedily as possible. The acetate of lead should be given according to the urgency of the case, & repeated at very short intervals; for it is believed that unless this remedy acts immediately, perhaps in half an hour, it does not have any effects whatever afterwards. It may be given by the rectum as well as mouth, & portions might be sprinkled on the internal surface of the uterus. Cooperating with this medicine, cold applications should be made to the abdomen, or any part of the patient except the feet, & legs, the covering should be very light, & the room kept as cool as practicable, and ice may be introduced into the vagina, & even into the uterus.

With regard to those hemorrhages where the placenta is retained either by the irregular action of the uterus, or scirrhus adhesions I do not think it necessary to make any observations; for the usual mode of delivering it must be had recourse to, provided the loss of blood, or other circumstances render it necessary. But in the performance of this operation too much circumspection cannot be observed; for with

out it we are not only liable to fail in the attempt, but we may do a great deal of mischief, either by a rupture of the cord, a lesion of the uterus, or we may produce an inversion of it. It is also of the utmost importance after an hemorrhage, particularly a profuse one, that the patient shall not be disturbed, or raised to an erect posture, for from a neglect of this precaution sudden death has sometimes happened, even when it was least expected: and we know by a recumbent posture life may be often sustained when an erect one would be inevitable death.

Finis